REMARKS

Summary Of The Office Action & Formalities

Claims 1-6 are all the claims pending in the application. By this Amendment, Applicants are adding new claims 7 and 8. No new matter is added.

The prior art rejections are summarized as follows:

1. Claims 1-6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamazaki (USP 4,816,113).

Applicants respectfully traverse.

Claim Rejections - 35 U.S.C. § 103

1. Claims 1-6 In View Of Yamazaki.

In rejecting claims 1-6 in view of Yamazaki, the Examiner reiterates verbatim the grounds of rejection set forth in the previous Office Action of August 1, 2001 for claims 1-4, and further rejects newly added claims 5 and 6 on the grounds that

> forming a thermal head having a 3 (sic) protective layers including a lower, intermediate, and carbon layer are well known to one skill (sic) in the art as described in page 8 of the specification. The thickness of each layer would have been obvious to determined (sic) through test runs in order to provide optimum thickness of each layer for protection of the thermal head with an anticipation of an expected result.

Office Action at page 3.

The Examiner responds to Applicants' traversal arguments set forth in the February 1, 2002 Amendment as follows:

> Referring to applicant's argument that there is no evidence or reasoning tending to show inherency; there is no access to laboratory at the Office for examiner to carrying out the actual

> process; therefore, since the pressure of the chamber is similar to that of the claimed invention, it would provide similar result, such as reduce any undesirable products including particles having a particle size of 0.5 um or more to 1000 particles/ft3/min or less. Furthermore, applicant would have access to the laboratory to carry out the process, burden is on the applicant to show that under processing conditions described above, including the P of $1x10^{-6}$ Torr or a higher vacuum condition, the process doesn't provide a result of reducing particles having a particle size of 0.5 um or more to 1000 particles/ft3/min or less. Even if it is not the case, it would be obvious to one of ordinary skill in the art to have a clean chamber before depositing any layer; therefore, one skill in the art would remove any foreign particles or contaminations in the chamber so that the layer being deposited is not contaminated with other particles, or chemicals.
>
> In response to applicant's argument that the particles are reduced in order to minimize the pinholes and cracks in, the thermal recording head protective coating, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).
>
> Concerning applicant's providing of the distinctions between applicant and applied prior art, none of these points are in the claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Office Action at pages 3-4 (emphasis added). Applicants respectfully disagree and maintain that Yamazaki would not have taught or suggested to one skilled in the art the features of method claims 1-6 for the reasons set forth in their Amendment of February 1, 2002, which is incorporated herein by reference.

Applicants understand that the USPTO, and specifically the Examiner, is not required to carry out experimentation to prove a result. However, in the case of Yamazaki, no such experimentation is needed on the part of the USPTO or the Applicant in order to establish that the process disclosed in this reference would not necessarily, or even likely, result in the conditions regarding the particle content and size recited in claim 1 of the present application.

In particular, there is no technical basis from which the Examiner can assert that the content of particles having a size of 0.5 μm or more is 1000 particles/ft^3/min or less. As Applicants explained in their last Amendment, the dry etching process disclosed in Yamazaki would not, in and of itself, result in the reduction of the content of particles having a particle size of 0.5 μm or more to 1000 particles/ft^3/min or less by the evacuation (to 1×10^{-6} Torr). To be sure, the pressure of 1×10^{-6} Torr disclosed in Yamazaki represents the quantity of a diluted gas in a vacuum, and does not correlate to the degree of the content of particles having a particle size of 0.5 μm or more to 1000 particles/ft^3/min or less. As Applicants further explained in their last Amendment, particles existing in a solid form are still deposited to the inner wall of the chamber or fall on the chamber floor and their existence cannot be represented by a pressure measurement. Moreover, the residual solid particles may cause a production defect by rounding about the object when the apparatus is actuated.

Applicants should not be forced to go through the expense of disproving the Examiner's position, when the technical merits of this position are understood by those skilled in the art to be obviously invalid and mistaken.

Again, the Examiner acknowledges that Yamazaki does not describe adjusting the content of particles having a particle size of 0.5 μm or more in the chamber to 1000 particles/ft^3/min or less before forming the carbon layer. Nevertheless, the Examiner asserts that in Yamazaki, the steps of cleaning the interior of the chamber and evacuating the chamber to produce a high vacuum in the chamber would necessarily result in the reduction of the content of particles having a particle size of 0.5 μm or more in the chamber to 1000 particles/ft^3/min or less because a high vacuum of 1×10^{-6} Torr or more is produced in the chamber by cleaning the interior of the chamber and then evacuating the chamber. This is technically incorrect.

Particles, especially those having a particle size of 0.5 μm or more, are not molecules and, accordingly, such particles not only float in the chamber but also adhere to the chamber walls or even pile up on the bottom of the chamber. The particles adhering to the walls or piling up on the bottom can not be removed from the chamber by producing a high vacuum in the chamber, even if the molecules, particles, etc. floating in the chamber can be removed in this way. Moreover, the adsorption force for some of the adhered or piled-up particles is weakened due to the generation of a high vacuum, thereby becoming smaller than the suction force produced by the vacuum, such that some of the adhered or piled-up particles leave the walls or the bottom of the chamber, float within the chamber, and exit the interior of the chamber. Some of the adhered or piled-up particles may leave the walls or the bottom of the chamber to float in the chamber as a result of, for instance, the removal of water etc., allowing the particles to adsorb to the walls or the bottom of the chamber by producing a high vacuum in the chamber.

If a vacuum continues to be drawn until the adsorbing particles no more leave the walls or the bottom of the chamber, that is to say, a theoretically perfect vacuum is achieved, the content of the particles floating in the chamber might be reduced to 1000 particles/ft^3/min or less. Also in that case, however, the particles adsorbing to the walls or the bottom of the chamber will never be removed in this manner.

Furthermore, the vacuum which can be produced is not indefinite. Hence, it is impossible to reduce the content of the particles in the chamber including those adsorbing to the walls or the bottom of the chamber to 1000 particles/ft^3/min or less.

In summary, based on the correct technical understanding of the art and the disclosure of Yamazaki, the steps of cleaning in the interior of the chamber, evacuating the chamber, and producing a high vacuum in the chamber disclosed by Yamazaki can not result in the reduction of the content of particles having a particle size of 0.5 μm or more in the chamber to 1000 particles/ft^3/min or less.

The Examiner also contends that, regardless of whether the vacuum pressure disclosed in Yamazaki would necessarily result in the claimed feature, it would have been obvious to clean the chamber before depositing a layer. Assuming for the sake of argument that one skilled in the art would have cleaned the chamber prior to depositing a layer, it is not the case that the skilled artisan would have been aware of the criticality of doing so to the degree required by claim 1. As Applicants illustrate in their comparative examples set forth in their Specification at pages 23-32, when a cloth that produces 300 particles/cfm of dust was used to clean the inner wall surfaces of the vacuum chamber and followed by aspiration of the floating dust particles with a

vacuum cleaner, the resulting thermal head had no signs of damage after 25,000 sheets were recorded. On the other hand, when a cloth that produces 5000 particles/cfm of dust was used to clean the inner wall surfaces of the vacuum chamber and followed by aspiration of the floating dust particles with a vacuum cleaner, or when the chamber was simply aspirated without first wiping with a cloth, the resulting thermal head showed signs of significant damage after recording only 5,000 sheets. This difference in performance clearly demonstrates the criticality of Applicants' method for forming a carbon layer, as well as the unexpected superior results achieved therefrom.

The Examiner also takes the position that Applicants may not rely on the argument that the reduction of the particles is to minimize pinholes, since this advantage "would flow naturally" from the prior art teaching. However, as explained above, Yamazaki makes no teaching or suggestion that would limit the particle size as required by the present claims, and, therefore, one practicing the art of Yamazaki would not realize the advantages of this feature.

The Examiner also argues that Applicants may not rely upon certain distinctions set forth in their February 1 Amendment that are not captured by the present claims. However, at least with respect to claims 3-6, Applicants may rely on the requirement that the method is used to apply the coating on a thermal head used to perform thermal recording. Therefore, Applicants may rely on any aspect of Yamazaki that would teach away from its use in the context of forming layers on a print head.

Therefore, in view of at least the foregoing distinctions, the Examiner is kindly requested to reconsider and withdraw the rejections of claims 1-6.

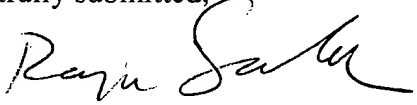
New Claims

For additional claim coverage merited by the scope of the invention, Applicants are adding new claims 7 and 8, which are believed to be allowable at least by reason of their respective dependencies. No new matter is added.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,



Raja Saliba
Registration No. 43,078

SUGHRUE MION, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037-3213
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 7 and 8 are added as new claims.